

Design of Affordable 3D Printers

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The recent expiration of Fused Deposition Modeling (FDM) patents sparked a growth in the 3D printing industry. Fused Deposition Modeling is the most common way of 3D printing parts. It takes a material, usually a plastic, melts it, and then builds a part layer by layer from the molten material. As patents for 3D printing technologies continue to expire, 3D printing will continue to see a large growth in popularity for several different applications; however, there are currently limitations on 3D printers preventing them from entering certain markets. The goal of our project was to address two of the biggest current limitations: the cost of the 3D printer and the ability to print with different materials. We addressed these issues by researching and building two different types of 3D printers along with researching different ways to print different materials. The goal for the first project was to design and assemble an affordable ceramic 3D printer. We researched and purchased an affordable delta 3D printer kit and an affordable ceramic extrusion system. The goal for the second project was to design and assemble an affordable dual extruder desktop 3D printer that could print two different plastics. We successfully built the delta 3D printer and it is working correctly. The dual extruder desktop 3D printer has been assembled. For both projects, we were able to assemble low-cost 3D printers. In conclusion, this research has resulted in two affordable 3D printers with the potential to 3D print different materials.